

## MONETARY VALUATION OF NON-MARKET PRODUCTIVE TIME METHODOLOGICAL CONSIDERATIONS

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After defining households' productive time in non-SNA activities, the paper discusses the most frequently used wage-based methods for imputing a value to this time. It argues that because the relation between market wages and household output is, at best, unknown, such valuations are not fruitful for economic analysis purposes. The paper then proceeds to show that it is possible to establish an output-related valuation of productive time which *per se* is relevant for economic analysis. Combined with time-use data, it can be used as a transitional measure for valuing household production at factors cost in a satellite account.

### 1. INTRODUCTION

This paper addresses the issue of the monetary valuation of the non-remunerated time households invest in the production of goods and services which are consumed, without undergoing market transactions, by the producing household or by related network households (family, friends, neighbours etc.). This is what Paul Brown refers to as "non-market informal productive time" (New Zealand, 1991). The valuation of unpaid work performed within the formal structure of organisations—voluntary work, compulsory unpaid labour, community work etc.—is not discussed here as its valuation raises different problems than those raised by the valuation of informal productive time.

According to the currently available information, the 1993 SNA recommends the inclusion of part of households' non-market production within the SNA production boundary and the use of a satellite account for the other part. In fact, in order to provide a complete picture of the production households generate outside the market mechanisms (production which ensures their "extended" consumption level), the satellite account has to borrow from the central accounts the within-the-boundary data and present them alongside the outside-the-boundary data (Lützel, 1989). The within-the-boundary non-market household production is valued at its imputed output value, according to the general rules of national accounting. (The time invested in production plays no role in this imputation and therefore falls outside the scope of this session on time-use.) Outside the boundary production should, and could, also be valued at its imputed output value. On conceptual grounds, this is generally agreed upon. However, in this relatively new field, statisticians hesitate to generate the necessary output data and try to avail

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themselves of time-use data in order to achieve some input-based valuation of households' non-market production.

The object of this paper is to discuss some of the questions relating time-use data and the monetary valuation of households' outside-the-boundary production. Is it possible to start from time-use data and to achieve a monetary valuation of households' non-market production? Which value should be imputed to productive time? For what purposes would such a valuation be meaningful?

## 2. PRODUCTIVE TIME

Non-market productive time is distinguishable from personal time by means of the "third person criterion." According to this criterion, an activity is deemed productive if it might be performed by some one other than the person benefiting from it; or, in other words, if its performance can be delegated to some one else while achieving the desired result. I can delegate the preparation of my meal (a productive activity); nobody can eat it for me (a personal activity).

*An activity can be productive in some respects and personal in others.* For instance, preparing a birthday cake for a beloved child is a productive activity (cakes can be bought) and also a personal activity (to prepare it as a testimony of love confers on it symbolic personal value). For economic valuation purposes, only the economic aspect of the output needs to be considered.

The same productive activity (for instance, vegetable gardening) may be perceived by some person as work while it is perceived by some one else as *leisure*. The activity is productive in as much as its output can be generated by a "third" person: this is the only thing that matters for economic measurement purposes; a "free time" activity or a "leisure time" activity can be productive. (A problem only arises in this area when one wants to use market wages for valuing households' non-market productive time; it is discussed in section 3 below). As already pointed out by T. P. Hill in 1979, whether the person performing an activity (market-oriented or non-market) derives *direct utility* from the performance, is irrelevant from the economic point of view. Economic valuations are deliberately limited to the economic dimension: personal and social values attached to the performance of activities must be considered in the analysis and interpretation of economic measurements, but they cannot be measured in economic units.

*Personal care activities are not necessarily personal activities.* For instance, tinting and setting one's hair is a personal care activity, but it can be done by a hairdresser and is therefore a productive activity. Shaving is a personal care activity which used to be performed by barbers on a much greater scale than currently in some societies, and was then unquestionably a productive activity. Bathing is a personal care activity which for the aged or the handicapped may require the intervention of a "third" person, although for a person in normal condition, it would be unconceivable in most societies to consider it as a productive activity. Social norms may set some limits to the application of the third person criterion.

To hire someone for household assistance in certain crises (e.g. hospitalisation of the mother of young children) appears normal in certain social groups. In other social groups the hiring is unacceptable because it contradicts the group norms: the support is expected to be given, and is given, by a non-remunerated third

person in the household's network. In both cases, the corresponding activities are productive because they can be *delegated*. The possibility to "hire" is not a requirement of the third person criterion.

In concrete terms, the productive non-market time under consideration in this paper is the time households devote to:

- care of persons (children, the aged, the ill and handicapped);
- meal preparation (cooking, serving, cleaning up);
- cleaning the dwelling and its surroundings;
- care of clothing and of household linen (laundering, ironing, mending);
- maintenance and repair of household premises and equipment;
- household management;
- all purchasing and travelling related to these tasks.

### 3. WAGE-BASED VALUATIONS OF PRODUCTIVE TIME

When national accountants first tried to determine the value of households' non-market time, they were mostly concerned with what was, at that time, called "housewives' services." In the countries where these first valuations were made (the U.S., Sweden and Denmark), in the 1920s and early 1930s, full-time domestic servants were still available and it seemed logical to borrow the value of their wages from the market and to impute it to unpaid work time. With the disappearance of domestic servants, other wages were borrowed from the market: firstly the wages of specialised domestic employees who would come to private households for cleaning, laundering, sewing or cooking; then, with the disappearance of the latter, the wages of employees performing similar functions in commercial enterprises were used. All of these wages were rather loosely determined and grouped under one general heading: market-replacement cost. From the mid-1960s, G. S. Becker (1965), K. J. Lancaster (1966) and their followers developed econometric models to account for households' decisions on time and other resources allocation. These models were then extrapolated to the macro-economic level and gave rise to a number of valuations of households' unpaid labour time based on average wages and usually referred to under the general heading: opportunity cost of time.

In the following paragraphs, we shall briefly discuss some aspects of these valuation methods in order of increasing relevance for national accounting and macro-economic analysis purposes. For a complete review and discussion of wage-based valuations, the reader is referred to some of our earlier publications. We shall stick to the terminology proposed there in order to avoid confusion in an already otherwise complex subject (Goldschmidt-Clermont, 1982, 1987a, 1987b, 1989, 1990 and 1992).

#### 3.1. *Average wages*

In this method, labour inputs into domestic activities are assigned an imputed value equal to average market wages: all workers' average or female workers' average, at various levels of education, in all or in particular sectors of the economy. This approach is derived from the "opportunity cost of time" method (also called "forgone wage" method).

In the opportunity cost of time method, labour inputs into domestic activities are assigned an imputed value which is the wage the unpaid household worker would have earned if he/she had worked in the market instead of working in the household. The method is based on economic theory which underlies econometric models designed for the study of consumer behaviour and time allocation at the household level. The theory and corresponding models are constructed on a number of assumptions: households allocate time so as to maximise returns; they have the possibility of substituting market time for non-market time (in units at the margin) and vice-versa; the forgone market wage reveals the utility value the household places on the allocation of its members' time to household production etc. Due to the assumptions involved, these models are subjected to severe criticism for their lack of validity outside of a limited circle of privileged households in developed economies.

Average wages have been used as a proxy for the forgone wages which determine households' time allocation when the unpaid household member has no market wage. Average wages have also been used in attempts to apply these econometric models to the macro-economic valuation of households' productive non-market time. However, opportunity cost of time is a household level concept which can be used for analysing households' behaviour in their attempt to achieve their social and personal goals, to maximise returns for their market and non-market work time while taking into consideration particular circumstances such as occupational skills, availability of market work, employment related expenses, journey to work etc. (Seel, 1991). Opportunity cost of time is not relevant for macro-economic purposes because it corresponds to a modelling exercise based on a number of assumptions which do not apply to the overall population, because it calls on utility considerations which are outside the realm of national accounting and because, most importantly, the value obtained carries no relation to actual household output, an approach which breaks away from one of the main characteristics of national accounting.

If we forget the economic theory and models that have led to the use of average wages, can we accept the latter as a valid basis for imputing a value on households' productive time? In other words, is it an acceptable approximation at the macro-economic level to assume that all work time, market and non-market, has the same average value? In our opinion, it is not because most market-oriented activities have little in common with household activities and are performed in very different productivity circumstances (an aspect discussed in more detail under the next heading). Also such a valuation is of no use for economic analysis: time-use data measure the labour inputs in time units; to multiply these data by a market wage which has nothing in common with household output gives a monetary value which varies in the longitudinal series according to the state of the market sectors of the economy, and not according to variations in household production. In other words, the multiplication by an average wage adds no useful information for economic analysis to the information yielded by the time-use data themselves.

### *3.2. Wages of workers performing equivalent functions in market enterprises*

In this method, labour inputs into domestic and related activities are assigned an imputed value which is the wage paid to workers performing similar activities

in market enterprises, the similarity being determined on the basis of the output of the activity. For instance, the wages of cooks in restaurants, of ironers in laundry shops, of nursery school teachers, of garage mechanics were used for imputing a value to the time devoted by households to meal preparation, care of clothing and household linen, care of children, repair of household equipment.

In market enterprises, productivity circumstances are different from those prevailing in the household; capital investments are higher and production is organised differently: mass production, streamlining, specialisation of tasks and skill requirements (Goldschmidt-Clermont, 1982; Fitzgerald and Wicks, 1990). These circumstances affect productivity and make it possible for enterprises to pay higher wages than they could pay if labour productivity was at the level of artisanal household production. On the other hand, households are in a more favourable position than market enterprises for the direct provision of personal services to household members. The wages of workers performing, in market enterprises, functions equivalent to those performed by households are therefore not a satisfactory basis for the imputation because they relate to the output of market enterprises and not to households' output and because, as a result, they do not provide information on household production for economic analysis purposes.

In addition, the imputation of wages corresponding to intensive labour in commercial enterprises raises problems when one wants to apply them to free time activities, proceeding at a leisurely pace. Another problem linked to the imputation of market wages is the valuation of simultaneous activities: which wage is appropriate for the time invested simultaneously in ironing, keeping an eye on the pot cooking on the stove and supervising children's homework?

### 3.3. *Wages of substitute household workers*

In this method, labour inputs into domestic activities are assigned an imputed value which is the wage a paid worker (polyvalent or specialised) would earn for substituting unpaid household labour, i.e. for performing, in the household, the same activities. The best wages (inclusive of payments in kind, paid holidays and fringe benefits) on which to base the imputation are those of polyvalent substitutes with household management responsibilities. In Finland, valuations of unpaid household work have used the wages of "municipal home helpers" (municipal workers who may or may not have received a short training course for their jobs and who are most often responsible for visiting elderly people from time to time) and of "municipal child minders" (person who cares for children in her own home and receives a wage defined in a collective agreement in addition to compensation for food and similar costs). (See Finland, 1980-86, Parts III, V, VIII and XI.) In Switzerland, a valuation was based on the wages of certified "household managers" ("Haushaltleiterin"); these persons usually help in households in cases of crisis when the housewife cannot perform her usual functions (Bund Schweizerischer Frauenorganisationen und Betriebswissenschaftlichen Institut der ETH, 1989). In some societies, however, such institutionalised household substitutes do not exist; the wages of polyvalent household employees (housekeepers performing several different tasks) may then be used, corrected, when relevant, to account

for the additional responsibilities and for the continuous availability of unpaid household workers.

These wages are paid for the performance of domestic activities; they are not appropriate for other non-market productive activities such as, for instance, maintenance and repair of household premises and equipment. For these, given the scarcity of artisans in industrialised economies, small enterprises are appearing which will answer any *SOS* call and will perform, in the household, repairs and small jobs (plumbing, electric, woodworking, mechanical etc.) The wages paid to these workers are relevant for these kinds of activities.

An often debated question is whether the values used for the imputation should be gross or net wages. In our opinion, for macro-economic purposes, wages net of taxes and of social security contributions should be used for the imputation because unpaid labour does not generate social security flows or income tax flows. (On the other hand, for household level purposes, gross wages of domestic employees are relevant as the household perceives the imputed value as a forgone expense i.e. as a saving of the total expenditure caused by the hiring of an employee).

For aggregate level valuations, the soundness of using wages which are linked to a given labour market is sometimes questioned. The argument goes like this: if, for instance, all unpaid housewives became paid domestic servants, or if all unpaid housewives sought employment and hired substitutes to perform domestic activities in their households, such major shifts of labour demand and supply would cause changes in wage rates and invalidate the corresponding valuations of households' non-market productive time. This argument implies that in order to use market wages in an imputation one has to assume a complete and instantaneous transfer of labour from unpaid to paid activity. We consider this an unnecessary assumption. Transfer of labour from unpaid to paid activity (and vice-versa) is a continuous and gradual process which constantly causes changes in wage rates. On the curve of these wage rate changes, one may determine, at one point in time and space, the market value of labour inputs without having to be concerned about what this value was or will be at another point in time. This consideration is not specific to value imputations; it pertains to all economic measurements: the prices used are the current ones and the fact they might become different in other circumstances is not taken into consideration.

The wages of substitute household workers (institutionalised as in Finland and Switzerland or, if not available, the corrected housekeepers' wages) are the most satisfactory wages for performing a wage-based valuation of households' productive time, because these substitutes work in productivity circumstances (equipment, production in small quantities etc., see Section 3.2) which are very close to those of unpaid household members. The imputation yields the *market value of time* invested by households in domestic activities, i.e. the market value of the labour factor in household production.

What is not known, because of lack of research on this subject, is how the wages of household substitutes relate to the value of household output. In other words, with this market value of their productive time, are households operating at a loss, i.e. does their output cost them more than it would cost them to buy the corresponding goods and services on the market? The relation wages/value

of output is known for market production which is entirely monetised and for which accounts are kept; market mechanisms maintain a balance between production costs and prices: if the wage load is too high, the enterprise goes out of business. The household does not know the value of its unpaid labour time and does not keep accounts; economic and financial constraints (not to speak of social or personal constraints) may cause available unpaid labour to be expended for lower returns than those prevailing in market production (Mueller, 1984; Nag, White and Peet, 1978). However, the reverse may also be true: high value of household productive time and a low value of market labour (Cabanero, 1978).

To conclude, we can say that *the unknown relation between the wages of household substitutes and the market value of household product is the major problem that arises when trying to put side by side in the satellite account, output-related valuations of within-the-boundary non-market activities and wage-based valuations of outside-the-boundary activities*. For the same reason, this valuation method does not provide the necessary information for economic analysis purposes such as: determining the relative shares of market-oriented production and of non-market production in extended consumption, comparing the respective shares of the market and of households in the supply of determined goods and services, or comparing the relative share of different household activities in supplying households with non-market income (i.e. income from non-market production). For this kind of economic analysis which has applications in socio-economic policy, it is necessary to know what is the market value of household output; no wage-based valuation yields the needed data.

#### 4. OUTPUT-BASED VALUATIONS OF PRODUCTIVE TIME

Is it possible to take stock of available time-use data for arriving at a valuation of household production that would be compatible with national accounts data? In discussing wage-based valuations of households' productive time, we have argued that their lack of relation to household output or the unknown relation between the imputed wage and the market value of household output are the obstacle to their use in macro-economic measurements and in economic analysis. Therefore, the point is now to determine if it possible to calculate a value of households' non-market productive time which is related to the value of household output. More precisely, is it possible to calculate for different groups of household activities the values of productive time which are output-related?

Four questions have to be answered. Can households' output be measured in physical units? Can it be valued at market prices? Can this output value be related to the corresponding productive time so as to yield an output-related valuation of time? Is such a valuation relevant for economic analysis purposes?

##### 4.1. *Measuring household output in physical units*

Physical quantities of goods and services produced by households (in all or some non-market activities) have been estimated in several studies, both in industrialised and in other countries (Clark, 1958; Chaput-Auquier, 1959; Morgan *et al.*, 1962; Alauddin, 1980; Dahl, 1979; Finland, Ministry of Social Affairs

and Health, 1980–86; Acharya and Bennett, 1981; Chadeau and Fouquet, 1981; Evers, 1981; Morgan, 1981; Sanik and Stafford, 1983; Hill, Martha, 1985; Lorfing and Khalaf, 1985; Bivens and Volker, 1986; Chadeau and Roy, 1987 and 1989; Fitzgerald and Wicks, 1990; etc.)

Of all these studies, the most comprehensive is the Finnish “Housework Study” because it covers the whole range of households’ non-market activities and was performed, in 1979, on a representative sample of some 2,000 households. It uses two approaches for measuring household output: a micro-level approach, by asking direct questions to the interviewed households, and a macro-level approach, by using available statistical information. Because of its comprehensiveness and because it was performed on a relatively large statistical basis, we shall rely on this study for *illustrating* some of the possibilities for measuring household output in physical units. We shall do this in some detail to show that, contrarily to a frequently expressed opinion, it is feasible to measure households’ output in physical quantities. Methods used in other studies may be just as valid for achieving output measurements.

#### Direct questions to interviewed households<sup>1</sup>

The households participating in the above-mentioned Finnish survey kept a diary indicating the time spent on household non-market production during two days and gave detailed information on the corresponding activities. In addition, the person mainly responsible for housework was asked detailed questions about productive activities and the related motivations. The following are a few examples of the kind of information provided by the replies to these questions, derived from parts VII, XII and XIII of the study:

- Home freezing: 49 percent of households froze food during the preceding year, an average of 14 kg. of fruit and berries, 1 kg. each of vegetables, tubers and mushrooms. Nearly 30 million kg. were frozen in the nation’s households during the preceding year. 50 percent of the households froze mainly for economic reasons, 29 percent mainly for quality, 14 percent mainly as a hobby or out of habit;
- Making clothes: 68 percent of households had made clothes during the preceding year; 86 percent of four-person families, 43 percent of single-person households;
- Wood and metal work: 17 percent of households performed wood and metal work during the preceding year;
- Laundry: the average household (2.73 persons) washed 390 kg. of laundry a year, or 143 kg. per person. In households with two children: 657 kg. per year, in households with no children: 218 kg. per year.

#### Use of available statistical information

In Finland, official statistics (census, national health and welfare statistics) give information which can be used for assessing, in physical units, the volume of household output. For instance:

<sup>1</sup>We are grateful to Dr Anniki Suviranta, then Director of the Research Department at the Ministry of Social Affairs and Health under whose leadership the study was performed, for providing us with an English translation of the interview questionnaires.

- Child care. The total number of children under the age of seven is known, as well as the number of those in paid day care part-time. Unpaid home care corresponds to the time children are at home with and under the control of some older member of the household, either in active or passive care; thus unpaid home care may in principle be performed in a household a full 24 hours a day, of which some is for active care (15 hours: 7 *am* to 10 *pm*) and some is for passive care (10 *pm* to 7 *am*). For children attending part-time outside care, the amount of active household care is calculated as the difference between 15 hours and the number of hours spent in outside care (Finland, 1980–86, part III).
- Care of the elderly, the handicapped or the ill. 4.1 percent of the nation's households had at least one person requiring help from other members of the household in their daily activities. Care varied from simply watching the person to providing complete bed care; bed patients totalled 6.6 percent of the persons receiving special care (*id.*, part V).

To conclude this presentation of households' output measurements, we can say that the examples taken from the Finnish Housework Study as well as the many others which could be taken from the other above-mentioned output-related studies show that the non-market output of households can be measured in physical units. The two approaches, micro-level questioning of households and macro-level use of available statistical information are complementary: interviews and time-use data made it possible to refine the amount of active day-care of children and the amount of special care obtained from the macro-level estimate. Statisticians are familiar with this kind of exercise. Apart from the fact that not much experience has been gained until now on the collection of data on households' non-market output, such data collection should appear much easier than data collection for the tremendous range of activities included within the national accounts boundary. Throughout a country, the range of non-market household activities is comparatively much smaller and more homogeneous. It is probably important to recall here that one of the advantages of satellite accounts is to make room for physical measurements. The physical quantities of households' output would directly find their place there, next to the corresponding physical quantities of labour inputs measured in hours. Meaningful economic analysis of households' productive activities can only occur if both input and output data are available and can be combined.

#### 4.2. *Valuing households' non-market output*

The second question raised in Section 4 is: once measured in physical units can household output be valued at market prices? The reply is given by several of the studies mentioned above which have used market prices as a basis for imputing a value on the product of some domestic activities. (We are departing here from the Finnish Housework Study as we have reservations about the valuation method—labour costs in market enterprises—it uses for valuing the measured output). The following are examples of prices which have been used or could be used for calculating the imputed gross output value of households' productive

activities:

- price of various types of foods or of meals available commercially, comparable in content and quality with the home-prepared ones;
- price of processed, semi-processed or commercially preserved foods;
- cost (price paid plus subsidies) of childcare in day-care facilities and of care of handicapped or elderly people in institutions;
- price paid for commercial laundering;
- price paid for the alteration or mending of clothes in commercial shops.

This procedure requires the selection of market goods and services equivalent to those produced by households. This selection can be achieved on the basis of household preferences expressly requested during the interview accompanying the time-use survey and/or on the basis of comparative tests which are carried out in many countries by consumers' associations and government bodies. The market prices may require adjustments for differences in quality from household products; similar adjustments of prices for quality are discussed at length in the SNA (United Nations, 1968, paragraphs 4.44 to 4.59). Statisticians are also familiar with the problems of price determination (an exercise similar to wages determination in wage-based valuations). For market goods and services similar to household product, several sources of information are available: official statistics (on prices, on consumer expenditures), special studies conducted for business, policy or other purposes (on care of children, on meals taken away from home), trade bulletins, price lists, etc.

At the micro-level, households perceive the value of their non-market production as a “forgone expense;” the full price as given by the market is the measuring stick of their saving. For macro-economic purposes, it might be necessary to deduct that part of the price which corresponds to flows not generated in household production, i.e. taxes, social security contributions and perhaps distribution costs (cf Section 3.3). The problem is similar to the old producer prices vs. retail prices problem. We do not aim at solving it here. The solution depends on what we consider the main uses of the data generated. Do we want to know how households react to changes in prices (due, for instance, to an increase in value-added taxes. Will households tend to produce more?) or do we want a macro-level assessment of the flows actually generated by “extended” production?

Thus the output of households' non-market activity can be valued at market prices on condition that the market offer a substitute for the household product. Such a condition is generally fulfilled in highly monetised economies, although in some rare cases the only available market substitute is the hiring of paid labour. In less monetised economies, the case may be more frequent; alternative approaches can then be envisaged as, for instance, the one used by Feachem *et al.* (1978) for valuing water carrying in Lesotho, where they took as a starting point the cost of constructing a water supply system.

We would like to underscore here that output-based valuations do not raise the problems encountered with wage-based valuations, relative to simultaneous activities, to free time productive activities and to differences in skills or equipment (cf. Sections 3.1 and 3.2). Output is valued independently of the time required for producing it and of the efficiency with which this time is used.

#### 4.3. *Relating output value and production time*

The third question raised in Section 3 is: can the imputed value of households' output be related to the corresponding productive time so as to yield an output-related valuation of time?

The imputed gross output value of non-market household output, calculated as outlined in the preceding paragraphs, corresponds, at the micro-level, to the saving (forgone expense) accruing to households for engaging in the productive activity. At the macro-level, it corresponds to the goods and services which, added to market-produced goods, constitute "extended" production.

Once the imputed gross output value has been calculated, households' intermediate consumption, the wages paid to domestic employees and the consumption of households' fixed capital can be deducted. (For a more detailed presentation, see Goldschmidt-Clermont, 1992). The value thus obtained corresponds:

- at the micro-level, to the saving (forgone expense) accruing to households for the *time* invested in production; these *returns to labour* correspond to mixed income (compensation of employees plus operating surplus) as in small-scale household enterprises operating for the market;
- at the macro-level, after deduction of taxes and addition of subsidies received by the corresponding market enterprise, the value obtained corresponds to the (imputed) income generated by households' non-market activities.

In order to compute returns to labour on an hourly basis (hourly rate of returns to labour), it is sufficient to divide them by the corresponding time investment. This is the *actual value of time expended in non-market household production*. It relates to the actual output generated in household production. Different activities generate different returns to labour. When intermediate consumption is costly while the market produces the substitute goods or services at a low price, returns to labour may even take a negative value (Goldschmidt-Clermont, 1983).

For micro-level valuations, intermediate consumption, wages paid to household employees and consumption of fixed capital can be computed from replies to the interview complementing the time-use diary. For macro-level valuations, intermediate consumption, wages paid, consumption of fixed capital, taxes and subsidies can be computed from available statistics as foreseen for the construction of the German satellite account (Lützel, 1989).

#### 4.4. *Returns to labour and economic analysis*

The fourth question raised in this section relates to the usefulness, for economic analysis purposes, of returns to labour calculated as suggested in the preceding paragraphs.

Returns to labour are interesting *per se* as they yield information on the relative productivity achieved by households in the various domestic activities (intra-activities comparisons). They also make it possible to compare returns to labour in non-market household production to the actual returns achieved by the household for labour in the market sector (gross wages and other employment-related benefits minus taxes, minus employment-related expenditures, minus travel-to-work costs in money and in time, etc.).

Returns to labour need not necessarily to be calculated by the institutions in charge of the national accounts. Academic institutions (economics, home economics) qualify for developing the methodology. In some countries, non-profit consumers' associations would be in an excellent position for performing such calculations and comparisons because of their experience in testing the quality of products and because the provision of comparative returns to labour (e.g. do-it-yourself vs. purchasing) would be an innovative way of advising consumers.

## 5. RETURNS TO LABOUR AND VALUATIONS AT FACTORS COST

Household production is a complete productive process which, in addition to labour inputs, requires capital investments and intermediate consumption. As discussed in the previous section, this economic activity can be valued on the basis of its output.

However large scale measurements of households' output are not readily available yet. Work is in progress for valuing household production at factors cost, the intention being to reduce the data collection burden by taking stock of available time-use data (Lützel, 1989). We have argued in Section 3, that the imputation of market wages for valuing the labour factor produces valuations which are of limited usefulness for economic analysis purposes. Returns to labour would constitute a better basis for the imputation because they relate to actual household output. Nevertheless a methodological discrepancy would remain in the satellite account: non-market production within the SNA, valued at the market price of the output and production outside the SNA boundary valued at factors cost. The same discrepancy applies for comparisons with the national accounts aggregates and for comparisons with specific sectors of market production.

Would the use of returns to labour help to achieve the desired goal of reducing the data collection burden? In principle, not; in fact, it would. In principle not, because valuations of output need necessarily to be established before returns to labour can be calculated. These output valuations can be used directly in the satellite account without resorting to time-use data and to returns to labour rates. In fact, however, resorting to returns to labour rates would reduce the immediate statistical burden, by permitting the *gradual development of output-related valuations* of household production in the following ways.

At the micro-level, in the first stages of development of the methodology, returns to labour could be calculated only for a limited number of households, without aiming at full representation of the population. Time-use studies have shown that the range and amount of activities performed differs across the population according to only a few parameters. Returns to labour could also be calculated for a limited number of activities, starting perhaps with those which are the most time-consuming (e.g. meal preparation) or the more urgently required for some policy purpose (e.g. care of children or of the elderly). The precision obtained will depend on the size and characteristics of the sample and on the approximations used for valuing output, but at least the results would be conceptually sound and susceptible of being improved upon as means become available. In short, sample size and coverage of activities can be adjusted to available resources.

At the macro-level, the relation income generated/labour inputs may, at first, be established globally for broad categories of activities (Chadeau and Fouquet, 1981); it can be refined in further stages of development of the methodology. Alternatively, the values obtained at the micro-level can also be used for imputations in the satellite account. If returns to labour are available only for part of the activities, these values can be averaged out and provisionally imputed to the other activities until returns to labour rates are available for all activities.

Our proposal is thus to resort to returns to labour as a transitional procedure for macro-economic valuations of household production at factors cost, pending the availability of data for direct valuations at output value.

## 6. CONCLUSIONS

In this paper, we have argued that:

- the imputation of market wages to non-market productive time according to the “opportunity cost of time method” is not compatible with national accounting procedures and should not be used for national accounting purposes;
- the imputation of other market wages, (“equivalent function in market enterprises” and “substitute household workers” methods) produces valuations which do not provide the necessary information for economic analysis purposes: the first method, because it is not related to household output and therefore breaks away from one of the main characteristics of national accounting; the second method, which yields the *market value of time* invested by households in production, because the relation of this value to household output is unknown;
- households’ productive time should be valued in relation to the imputed market value of the product, namely at the returns which accrue to households for engaging in the productive activity after deduction of all expenses incurred in the productive process: these returns to labour constitute the *actual value of time* invested in production;
- returns to labour are *per se* useful for economic analysis purposes;
- returns to labour are more appropriate than market wages for a valuation of household production at factors cost, as a transitional measure pending the availability of data for the direct valuation of household production at its output value.

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